SAMPLING AND ANALYSIS PLAN
INITIAL INVESTIGATION AND ASSESSMENT

Neponset River Dredge Spoils
Milton & Boston, Massachusetts

MassDEP SARSS IV Project No. 101250

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MACTEC Project No: 3650-07-0095

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Date

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ACRONYMS AND ABBREVIATIONS

ACOE	Army Corps of Engineers
bgs	below ground surface
COC	chain of custody
DCR	Department of Conservation and Recreation
DQOs	Data Quality Objectives
GIS	Geographic Information System
GPS	global positioning system
ID	identification
IDW	investigation derived wastes
MACTEC	MACTEC Engineering and Consulting, Inc.
MassDEP	Massachusetts Department of Environmental Protection
MCP	Massachusetts Contingency Plan
MDC	Metropolitan District Commission
MS	matrix spike
MSD	matrix spike duplicate
PCBs	polychlorinated biphenyls
PID	Photoionization detector
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
SARSS IV	Site Assessment and Remediation Support Services
SOPs	Standard Operating Procedures
T&H	Tileston and Hollingsworth
USGS	United States Geological Survey
VOCs	volatile organic compounds

1 INTRODUCTION

1.1 OVERVIEW

The Massachusetts Department of Environmental Protection (MassDEP), under the Site Assessment and Remediation Support Services (SARSS IV) contract, has retained MACTEC Engineering and Consulting, Inc. (MACTEC) to conduct an initial investigation and assessment of dredge spoils along the Neponset River in Milton and Boston, Massachusetts (Figure 1). The objective of the proposed work is to collect samples from areas of the Site currently being utilized by the public, and assess the analytical data to determine whether polychlorinated biphenyls (PCBs) or metals are present at concentrations that may pose a potential Imminent Hazard under the Massachusetts Contingency Plan (MCP). The results of the proposed work will be summarized in a limited data transmittal report.

1.2 BACKGROUND

In 1955, much of southern New England, including the Neponset River (the river), was flooded during a storm event. Due to the widespread damage to dams along the river, the Metropolitan District Commission (MDC, currently Department of Conservation and Recreation (DCR)) took ownership of the dams and began repair work and flood control improvements. In 1962 and 1964, the MDC issued two contracts to dredge sections of the river bordering Milton and Boston. The 1962 contract included dredging the river from upstream of the Walter Baker dam to the Tileston and Hollingsworth (T&H) dam, and the 1964 contract included dredging from the T&H dam to the Neponset Valley Parkway. The dredging deepened the channel, improving flood storage capacity. Dredge spoils and concrete were used to reinforce the riverbanks and were spread in low-lying areas next to the Neponset River. Some of these dredge spoils are now adjacent to recreational areas or used (both with and in some instances, without permission) as recreational areas.

In recent years, efforts to restore the river's ecological and recreational value prompted the United States Army Corps of Engineers (ACOE) to collect two bottom sediment cores in 2002. Analytical results indicated that PCBs, among other contaminants, were present in these samples. In December 2002, the United States Geological Survey (USGS) performed a sediment survey of the 1962 and 1964 dredged sections of the river, including a total of approximately 60 sediment and surface water samples. Analytical results indicated elevated concentrations of PCBs and

some metals. Based on these results, concern has arisen that the dredged sediments placed on the banks of the Neponset River were also contaminated and could potentially pose an Imminent Hazard to human health per the MCP.

The DCR has reviewed 1962 and 1964 plans of the dredge spoil locations. These locations in some cases correlate to areas currently used as walking paths and for recreation. DCR developed a list of dredge spoil areas that warrant assessment using these historical plans and knowledge of the most accessible areas. This list is reproduced in Table 1 and is the focus of the initial assessment activities described herein.

1.3 SITE HISTORY

The dredge spoils areas are located in Milton and Boston, Massachusetts. These areas are in close proximity, and often directly next to the Neponset River (Figure 1). The MassDEP has requested that MACTEC provide initial investigation services to assess PCB and metal concentrations in the publicly accessible dredge spoil areas. Specifically the dredge spoil areas identified in Table 1 are included in the initial investigation and assessment.

TABLE 1
DREDGE SPOIL AREAS TO BE INVESTIGATED

Contract	*Dredge Spoil Area*	*Contract Station ID*	*Description and Nearest Receptor*
1962 Contract (C-294)	C-294 Spoil Area "C"	105+ 20 to 117+ 25	Residential Area near Truman Highway, Milton
	C-294 Spoil Area "D"	92+ 30 to 101+ 81	Residential Area near Edgewater Drive, Boston
	C-294 Spoil Area "E"	88+ 90 to 91+ 91	DCR building on Truman Highway, Milton
	C-294 Spoil Area "G"	62 to 64+ 76.39	Public access/path near Riverside Place, Boston
	C-294 Spoil Area "H"	42.80 to 59+60	Ryan Playground (DCR) near River Street, Boston
	C-294 Spoil Area "I"	39+93 to 62+62	Residential Area near Eliot Street, Boston
1964 Contract (C-296)	C-296 Spoil Area "A"	150.42 +157.80	Business/Residential Area near Railroad Avenue/Riverside Square, Boston
	C-296 Spoil Area "C"	234+87 to 247+95	Business area (Stop & Shop) near Truman Highway, Milton

Note: Contract Station Identifications (IDs) are measurements off the centerline of the Neponset River noted on the DCR Dredge Spoil Plans.

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1.4 PROJECT PURPOSE AND OBJECTIVES

The purpose of MACTEC's initial investigation is to characterize PCB and metals content of the publicly accessible dredge spoils. Based on the investigative findings, MACTEC will evaluate whether a potential Imminent Hazard exists under current site conditions and use.

1.5 REGULATORY ISSUES

Work conducted during the course of the investigations is subject to appropriate local, state, and federal laws and regulations including, but not limited to the MCP 310 CMR 40.0000.

If during the course of the investigations at the site, conditions are observed by project personnel that appear to trigger or exceed criteria in the MCP, the MACTEC Project Manager must be contacted immediately. The Project Manager will in turn contact the MassDEP Project Manager. MassDEP will inform the property owner of notification obligations. Should the MACTEC Project Manager be unavailable, informed project personnel will have the responsibility of notifying the MassDEP Project Manager. In either case, internal documentation of the communications is required.

2 PROJECT ORGANIZATION AND RESPONSIBILITIES

The following paragraphs describe the project team organization and responsibilities of key personnel who will be working on the project. Key personnel will include individuals from MACTEC, including the MACTEC SARSS IV Program Manager. Alpha Woods Hole Lab will be used to perform the laboratory analysis of collected samples.

2.1 PROGRAM MANAGER

The Program Manager is Alan Fillip.

2.2 PROJECT MANAGER

The Project Manager is Alan Fillip. Mr. Fillip will monitor the project budget and schedule and ensure the availability of necessary personnel, equipment, and subcontractors. She will be responsible for performing appropriate technical reviews of the work product as required and be responsible for coordinating the task assignments with project staff. She will serve as liaison to MassDEP. Mr. Fillip is also in charge of preparing progress reports and reviewing the financial progress of the project.

2.3 GENERAL SUPERVISOR

The Project Leader is Daron Kurkjian. Mr. Kurkjian will be responsible for work plan preparation and documentation, day-to-day oversight of field activities, and preparation of reports. Mr. Kurkjian will also be responsible for implementing field activities and coordinating with subcontractors. Mr. Kurkjian will communicate with the Program Manager / Project Manager regarding the progress of fieldwork and will assist the project staff in interpreting data and preparing project deliverables.

3 DATA COLLECTION AND DATA QUALITY OBJECTIVES

The following sections document the types and number of samples, methods of sample collection, and associated field activities, and data quality objectives (DQOs). Refer to Figures 2-6 for proposed sampling locations and Appendix A for the applicable MACTEC Standard Operating Procedures (SOPs).

3.1 DATA COLLECTION

As previously stated, the objective of the project is to evaluate current site conditions and identify the potential for an Imminent Hazard. This objective will be realized through an initial investigation of surface soil samples from the dredge spoil areas and sediment samples from readily available areas of the river. The samples will be collected using the sampling program outlined below.

3.1.1 Surface Soil Sampling

MACTEC will collect surface soil samples for laboratory analysis at the eight dredge spoil areas identified in Table 1. The proposed surface soil sample locations are presented on the attached Proposed Sampling Location Plans (Figures 2 through 6). On April 18, 2007 a visit was made to each of the Dredge Spoil areas to familiarize project personnel with the dredge areas. The open areas and trails shown on the Figures are illustrative and provided to note some of the key access areas observed during the April 18, 2007 site visit. The sample locations shown on Figures 2 through 6 are presented as proposed locations only, and are based on public access and use observed during the site visit. Actual sampling locations may vary, depending upon further site reconnaissance at each dredge area to field identify the most representative locations prior to sample collection.

The approach to surface soil sampling is provided in the paragraph below. SOPs for sampling and associated activities are provided within Appendix A of this report. The proposed surface soil sample locations are identified and the reasoning for these locations is provided in the following paragraphs.

Surface soil samples will be collected from two depth intervals. The first depth interval will be from the ground surface (0 inches) to 6 inches below ground surface (bgs) and the second interval

will be from 6 inches to 12 inches bgs. Soil samples will be collected with a stainless steel hand auger. The soil from each depth interval will be placed in a dedicated stainless steel bowl for homogenization with a dedicated stainless steel sampling spoon. Properly preserved surface soil samples will be submitted to Alpha Woods Hole Lab under chain of custody (COC) for chemical analysis in accordance with Table 2. If a proposed sample location is deemed inaccessible or refusal is encountered within 12 inches bgs, a new sample location in close proximity to the original sample location will be selected. All sampling activities will be photo- documented and recorded in a field log book. Physical characteristics of the soil samples will also be documented on field sampling sheets for surface soil (Appendix B). The sample spacing will be approximately 100-feet between sample locations in open areas and within walking paths. Appropriate analytical methods for each sampling media to be analyzed during the project are listed in the Quality Assurance Project Plan (QAPP) (MACTEC, June 27, 2007 (Draft)) and Table 2 below.

TABLE 2
ANALYTICAL METHODS

Media	Analyte	Method
Soil & Sediment	Metals	EPA 3050B/ 3051, EPA 6010B, EPA 7471
	PCB	EPA 3540C, EPA 8082

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PCB Analysis will be specific to Aroclors (EPA Method 8082) and Metals Analysis will be the 13 Priority Pollutant metals. These metals are Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium and Zinc. For the PCB analysis, Alpha Labs will spike Aroclor surrogates within the sample extract. In addition, the lab will spike samples to allow for congener analysis if requested. The decision to perform additional congener analysis will be made by MassDEP based on Aroclor results and will be decided within 30 days of sample collection. The Congener Analysis would be performed by Alpha Labs.

Refer to MACTEC SOP numbers 4.C.5.8, 4.C.5.28, 4.C.5.33, 4.C.5.52, 4.C.5.55, 4.C.5.56, and 4.C.5.57 for detailed sampling procedures and documentation requirements. The SOPs are available in Appendix A. Applicable MACTEC SOPs are summarized in Table 3 below.

TABLE 3
SUMMARY OF APPLICABLE MACTEC SOPs

Name	ID Number
How to Prepare for Field Work – Field Operations Leader	4.C.5.8
How to Complete Soil Boring Log	4.C.5.28
How to Manage Investigation Derived Waste	4.C.5.33
How to Decontaminate Sampling Equipment	4.C.5.34
How to Identify Site Conditions and Setting and Sketch a Site Map	4.C.5.35
How to Screen Sample Headspace for VOCs	4.C.5.37
How to Collect/Document an Equipment Blank Sample	4.C.5.48
How to Collect/Document Sediment Sample	4.C.5.50
How to Collect/Document Subsurface Soil Samples	4.C.5.52
Field Log Book Entries	4.C.5.55
How to Complete A Chain of Custody Record	4.C.5.56
How to Generate and Label Samples	4.C.5.57
How to Pack and Ship Samples to Lab	4.C.5.59

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The following paragraphs identify sample locations and sampling rationale for each of the dredge spoil areas.

Dredge Spoil Area 1962-C

Dredge Spoil Area 1962-C includes a publicly accessible open grassy area and wooded land. Thirteen proposed sample locations have been selected for this area and are presented in Figure 2. The sample locations are situated to provide representative sampling to determine contaminant concentrations in the most accessed portions of this dredge spoil area.

Dredge Spoil Area 1962-D

Dredge Spoil Area 1962-D includes a walking path along the river that leads to Kennedy Playground. The 16 surface sample locations in this area are situated along the walking path and the canoe launch adjacent to Kennedy Playground. The path in this area is located between a stone- wall and the Neponset River. Based on historic photographs, the stone- wall predates the dredging activities of 1962. It also appears that the playground area pre-dates the dredging activities. However, one sample will be collected from the public garden area and one sample will be collected from the "playground" area of the Kennedy Playground for confirmatory purposes.

Fishing bobbers provided evidence that fishing occurs along the riverbanks in this area. The approximate sample, path, and playground locations are presented in Figure 3.

Dredge Spoil Area 1962-E

Dredge Spoil Area 1962-E is a mostly grassy open area with a canoe launch. The area includes benches and walking paths. Sample locations will focus on these accessible areas and are presented in Figure 3. A total of 6 surface soil sample locations have been designated for this area.

Dredge Spoil Area 1962-G

Dredge Spoil Area 1962-G is a wooded area consisting of debris and includes an apparent homeless person encampment. The five surface soil sample locations for this area are located within the apparent homeless encampment and on surrounding paths. A sixth sample location between Dredge Spoil Area 1962-G and Dredge Spoil Area 1962 H has been chosen to determine if these two areas may be contiguous dredge spoil areas. Please refer to Figure 4 for the sample locations and area features.

Dredge Spoil Area 1962-H

Dredge Spoil Area 1962-H is the second largest dredge spoil area after Dredge Spoil Area 1962-I. Dredge Spoil Area 1962-H includes three canoe launches, a wide and heavily trafficked path, and is adjacent to Ryan Playground. The 19 surface soil sample locations are situated within the walking path and the three canoe launch areas. Although historic dredge plans do not indicate that the playground areas were used for placement of dredge spoils, due to the high intensity of their use, three sample locations have been selected within Ryan Playground and associated athletic field, to provide a negative confirmatory assessment. Please refer to Figure 4 for the sample locations and area features.

Dredge Spoil Area 1962-I

Dredge Spoil Area 1962-I is the largest dredge spoil area to be sampled. This area is mostly wooded and contains a narrow walking trail. Based on the area of most use a total of 17 surface soil sample locations have been strategically placed within Dredge Spoil Area 1962-I.

A presumed teen "social area" (benches, chairs and empty bottles and cans) was noted during the May 18, 2007 site visit. Two sample locations are proposed for this "social area". Additional sample locations are proposed at approximately 100- foot intervals within the paths.

On the western extent of this dredge spoil area a grassy open area exists. Several golf balls were observed in this area. Three sample locations have been selected in this area.

The middle section of 1962-I did not appear to be actively used during the site visit and wasn't walked at that time. Three sample locations are proposed along the southern boundary of this mapped dredge area. These samples will be collected if obvious signs of use by residents are observed during the field sampling program.

Please refer to Figure 4 for the sample locations and area features.

Dredge Spoil Area 1964-A

During the May 18, 2007 site visit, MACTEC walked a section of property identified by DCR representatives as Dredge Spoil Area 1962-A. However, based on subsequent review of the dredge plans for this area, it appears that Dredge Spoil Area 1964-A is actually located northeast of the area that was identified as 1962-A. The area walked on April 18, 2007 included a narrow walking trail in a mostly wooded area. Two open areas along the riverbank were noted and are depicted on Figure 5. One of these open areas extends onto the southern end of residential properties. Three samples are proposed for the area identified by DCR as being Dredge Spoil Area 1962-A, one sample is proposed for the open area, and two samples are proposed for the two residence back yards that appear to be underlain by dredge spoils, based on the historic dredge plans.

An additional three sample locations are proposed along the southern boundary of other residential properties along Riverside Square. These samples will be collected if obvious signs of use by residents are observed during the field sampling program.

The 11 sample locations in this area are depicted on Figure 5.

Dredge Spoil Area 1964-C

Dredge Spoil Area 1964-C consists of mostly overgrown wooded land and inferred wetland with a limited open area adjacent to parking lot of a shopping center. A total of six surface soil sample locations have been proposed in this dredge spoil area. One sample location is proposed to assess the contaminant concentrations within the accessible area. Additional sample locations are proposed to help characterize this area. The location of these samples will be further evaluated during field sampling activities. Please refer to Figure 6 for a depiction of the sampling locations.

3.1.2 Sediment Sampling

Sediment sampling will be performed at the following five identified canoe launch areas to assess the potential contamination of sediments accessible to boaters. The sample locations are depicted within Figures 3 and 4. One canoe launch is located within Dredge Spoil Area 1962-E and one is located across the river adjacent to Dredge Spoil Area 1962-D. The other three canoe launches are located adjacent to Dredge Spoil Area 1962-H.

One sediment sample will be collected from each location. Each sediment sample will be collected from the top 6 inches of the sediment column in a location at each canoe launch that is below approximately 4 inches to 12 inches of water. The samples will be collected with the use of a stainless steel shovel, hand trowel, or auger. If one of these methods does not provide adequate sample volume, a decontaminated stainless steel bowl will be utilized as a scoop to retrieve the sample. Excess water will be decanted from the bowl prior to homogenization with a stainless steel spoon and collection of the sample in the appropriate bottle ware. All sampling activities will be photo- documented and recorded in a field log book. Physical characteristics of the sediment samples will also be documented on field sampling sheets for sediment (Appendix C). Refer to MACTEC SOP number 4.C.5.50 for sediment sampling procedures.

3.1.3 Decontamination

Decontamination of hand tools shall be performed between sample locations. Stainless steel bowls and spoons will be decontaminated between before each use. Refer to MACTEC SOP Number 4.C.5.24 within Appendix A for the proper decontamination procedure.

The decontamination process will include washing and brushing the stainless steel hand auger and bowls/spoons that will be used on more than one sample location. Potable water will be used with Liquinox for an initial rinse and wash. The hand tool will then be sprayed with deionized or distilled water to rinse off the soap solution. The hand tool will then be sprayed with hexane. A final rinse with distilled or de-ionized water shall be performed followed by air drying the hand tool. Decontamination activities will be performed over polyethylene sheeting and investigation derived wastes (IDW) will be handled as described in the Waste Management Plan. Refer to Appendix A the complete MACTEC decontamination SOP.

3.1.4 Global Positioning System Surveying

All surface soil sample and sediment locations shall be surveyed with a global positioning system (GPS) backpack unit. The sample locations will be logged electronically and uploaded to Geographic Information System (GIS). In areas where dense tree cover restricts satellite reception, swing ties from GPS logged locations will be taken. In addition, walking paths or other pertinent site features may be surveyed with GPS.

3.2 DATA QUALITY OBJECTIVES

The DQO process is a strategic planning approach that is used to prepare for a data collection activity. It provides a systematic procedure for defining the criteria that a data collection design should satisfy, including when to collect samples, where to collect samples, the tolerable level of decision errors for the study, and how many samples to collect. The DQO Process consists of seven steps, as described below. The output from each step influences the choices that will be made later in the Process. Even though the DQO Process is depicted as a linear sequence of steps, in practice it is iterative; the outputs from one step may lead to reconsideration of prior steps. This iteration should be encouraged since it will ultimately lead to a more efficient data collection design. During the first six steps of the DQO Process, the planning team will develop the decision performance criteria that will be used to develop the data collection design. The final step of the Process involves developing the data collection design based on the DQOs. The first six steps should be completed before the planning team attempts to develop the data collection design because this final step is dependent on a clear understanding of the first six steps taken as a whole.

1. State the Problem — Concisely describe the problem to be studied. Review prior studies and existing information to gain a sufficient understanding to define the problem.
2. Identify the Decision — Identify what questions the study will attempt to resolve, and what actions may result.

3. Identify the Inputs to the Decision — Identify the information that needs to be obtained and the measurements that need to be taken to resolve the decision statement.
4. Define the Study Boundaries — Specify the time periods and spatial area to which decisions will apply. Determine when and where data should be collected.
5. Develop a Decision Rule — Define the statistical parameter of interest, specify the action level, and integrate the previous DQO outputs into a single statement that describes the logical basis for choosing among alternative actions.
6. Specify Tolerable Limits on Decision Errors — Define the decision maker's tolerable decision error rates based on a consideration of the consequences of making an incorrect decision.
7. Optimize the Design — Evaluate information from the previous steps and generate alternative data collection designs. Choose the most resource-effective design that meets all DQOs.

The DQO process used for this Site is summarized in Section 5.1 of the QAPP. In terms of data collection, the appropriate field screening and laboratory analytical levels for this project include laboratory analysis for PP-13 metals and PCBs. Table 2 presents the analytical methods and Table 4 presents a summary of sampling requirements per media.

TABLE 4
SUMMARY OF SAMPLING REQUIREMENTS

Parameter	Media	Analytical Method	**No. of Samples**	**Field Duplicates**	**MS**	**MSD**	**Rinsate Blanks***	**Sample Totals**
PCBs	Soil	EPA 3540C, EPA 8082	200	20	10	10	10	250
Metals		EPA 3050B/ 3051, EPA 6010B, EPA 7471	40	4	2	2	2	50
PCBs	Sediment	EPA 3540C, EPA 8082	5	1	0	0	0	6
Metals		EPA 3050B/ 3051, EPA 6010B, EPA 7471	5	1	0	0	0	6

Notes: * = Aqueous Media

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4 SAMPLE REQUIREMENTS

4.1 SAMPLE CONTAINERS

Sampling containers for each analysis are described in the QAPP.

4.2 PRESERVATION AND HANDLING

Sample preservation and handling will be performed in accordance with the QAPP. Samples will be placed in coolers so that the sample temperature is maintained at 4°C during transport to the laboratory. Sample bottles will be packed using Styrofoam, vermiculite, or "bubble pack" so that no motion is possible. Ice will be placed in double "ziplock" bags and added to the cooler along with all paperwork in separate a "ziplock" bag. Sealed containers of heat transfer fluids (e.g., "Blue Ice") may be used in lieu of ice. Solid carbon dioxide (dry ice) will not be used. Custody seals will be placed on opposite edges of the cooler lid. The cooler will be securely taped shut prior to shipment, unless the pickup up by the laboratory courier. All samples will be transported to the laboratory via courier or overnight express service.

4.3 SAMPLE IDENTIFICATION

Sampling nomenclature for surface soil samples and sediment samples will follow a prescribed designation process. The sample identification (ID) number will first identify the sample matrix, followed by the ID code for the dredge spoil area, the sample location number, the sample depth interval, and sample QC parameter, if applicable (Matrix-Dredge Spoil Area – Sample Location ID – Depth Interval – QC Parameter). This nomenclature system is further described below.

Matrix:
The sample ID will begin with either two letters denoting the sample matrix. "SS" will be used to designate a surface soil sample and "SD" will be used to designate a sediment sample.

Dredge Spoil Area Designation:
The sample location will be denoted with the dredge year first (either 1962 or 1964) and then the letter for the area. For example, samples collected from dredge spoil area C under the 1962 MDC dredge contract will be denoted by 1962C.

Sample Location:

The sample ID will include a sample number from 1 through 100 to identify the location from which it was collected.

Depth Interval:

The depth interval will be noted in inches and include two digits for the starting depth and two digit for the ending depth. Samples collected from the ground surface to a depth of 6 inches will be noted as 0006 (0 inches to 6 inches). Samples collected from 6-inch to 12-inch depth interval will be labeled with 0612.

QC Parameters:

If a sample is a matrix spike (MS) or matrix spike duplicate (MSD), these designations will be attached to the end of the sample ID.

All field duplicate samples will be identified so as to be blind to the laboratory. Duplicate field samples will be identified by the sample matrix followed by the ID number (SS-DUP-01). When a duplicate sample is collected, the field logbook and Sample Log Sheet will identify the duplicate ID number.

Example Sample IDs:

Provided below are two examples of possible sample conditions and the corresponding sample ID.

Example 1:

The fifth sediment sample location, collected from Dredge Spoil Area 1962-H, at a depth of 0 inches to 6 inches from the surface.

Sample ID = SD-1962H-5.0006

Example 2:

The 85th surface soil sample location, collected within Dredge Spoil Area 1964-C, at a depth of 6 inches to 12 inches and also a MS/MSD sample.

Sample ID = SS-1964C-85.0612-MS/MSD

4.4 SAMPLE LOG

Field logbooks will be kept by individual personnel working on-site and to document all field activities. All information pertinent to sampling (including instrument calibration data) will be recorded in the field logbooks. These books will be bound and pages will be consecutively numbered. However, physical soil characteristics will be logged on field sheets for surface soil sampling. Entries in the logbook will be made in black, waterproof ink and will include, at a minimum, a description of all activities, individuals involved (sampling and oversight), date and time of sampling, weather conditions, any problems encountered, and all field measurements. A plan of each day's activities and a summary of each day's accomplishment will also be entered. Refer to Appendix A for the MACTEC SOP number 4.C.5.55 for logbook documentation. Photo-documentation of sampling activities will also be collected.

4.5 CHAIN OF CUSTODY

All samples will be accompanied by a complete COC record as described in the QAPP, and properly signed by individuals handling the samples. Refer to Appendix A for the MACTEC SOP number 4.C.5.56 for COC preparation.

4.6 FIELD QUALITY ASSURANCE/QUALITY CONTROL

For quality assurance and quality control purposes, duplicate samples, trip blanks and equipment blanks will be collected and analyzed along with samples collected for this assessment. The Quality Assurance/Quality Control (QA/QC) procedures for field sampling are described in the QAPP.

4.7 DATA REDUCTION

Data evaluation activities for samples will consist of QA review of all data packages from the laboratory to ensure that all analyses were performed in accordance with specified methodologies and within the required holding times. The QA review will also include review of the laboratory QA/QC data. All sample data will be entered in MACTEC's database and presented in tabular format. Refer to the QAPP for a complete description of data evaluation.

5 ANALYTICAL

5.1 FIELD SCREENING

For the safety of field personnel, field screening for volatile organic compounds (VOCs) will be performed during soil sampling activities. The photoionization detector (PID) will be a Mini-Rae 2000 equipped with an 11.7 eV lamp. All calibration and QA/QC procedures are contained in the QAPP. Field screening results will be recorded in the field logbook. No PCBs or metals field screening will be performed on soil samples.

5.2 LABORATORY

All laboratory analytical and QA/QC procedures for this project are presented in the QAPP.

5.3 QUALITY ASSURANCE/QUALITY CONTROL

The QA/QC requirements for this project are presented in the QAPP.

6 EQUIPMENT NEEDED FOR FIELD WORK

- Sampling containers (from lab based on analysis and number of samples presented in QAPP) – Preserved as required
- Deionized water – analyte free (obtain lab certification that DI water is "analyte free")
- Logbooks
- Plastic sheeting (roll) for staging and decontamination areas
- Liquinox
- Gloves (boxes)
- PID
- Manufacturers calibration and instrument manual
- Ice coolers
- Black indelible pen
- Plastic trash bags
- Safety glasses
- Plans (HASP, QAPP, SAP and WMP)
- COC forms (from lab)
- Safety equipment (first aid kit, eye wash)
- Sampling forms
- GPS Backpack Unit
- Measuring tape/ruler
- Hand auger/corer
- Shovel and/or hand trowel
- Flashlights
- Decon buckets, brushes, sprayers

7 SCHEDULE

The project schedule will be finalized with the MassDEP prior to on-site mobilization. Site work is anticipated to take place in December 2007 / January 2008.

FIGURES